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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,615	07/07/2003	Shaotian Wang	88-2041A	7475

24114 7590 12/08/2004

LYONDELL CHEMICAL COMPANY
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EXAMINER

LEE, RIP A

ART UNIT PAPER NUMBER

1713

DATE MAILED: 12/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/614,615

Applicant(s)

WANG, SHAOTIAN

Examiner

Rip A. Lee

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10102003.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless —

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-6, 9-13, 17, 18, 21, and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,765,074 to Sartain.

Sartain claims a process for polymerization of olefins in the presence of an activator and a supported organometallic complex containing a Gp 3-10 metal and at least one indenoindolyl ligand wherein the support is treated with an organoboron or an organoaluminum (claim 1). The patent also teaches use of an organozinc to treat the inorganic support. Suitable activators are discussed thoroughly in col. 3, lines 6-26, and these include methylalumoxanes, trialkyl/triaryl boron compounds, and ionic borates. The support is pretreated prior to immobilization of the organometallic component (col. 3, lines 65-67). The inorganic support of choice is silica (col. 4, line 60). As indicated in col. 3, lines 62-64, the activator can be deposited on the support (*i.e.*, activator is deposited onto support prior to combining with organometallic complex, as in example 1, col. 6, lines 20-29), or it can be introduced separately (as combination of organometallic precursor and ionizing activator (col. 3, lines 27-34). The process of the invention is used to polymerize alpha olefins such as ethylene, propylene, and mixtures thereof (col. 5, lines 24-29). The polymerization process occurs at a range of up to 300 °C, and it is amenable to liquid phase (slurry) or gas phase processes (col. 5, lines 31-33). Example 1 shows an organometallic complex containing the 3,10-dimethylindeno[3,2-*b*]indolyl ligand, and this ligand meets the structural features delineated in present claim 13. In summary, the subject matter of the present claims is taught adequately in the prior art of Sartain.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sartain.

The discussion of the disclosures of the prior art from the previous paragraph of this office action is incorporated here by reference. Sartain does not prescribe a specified amount of organozinc for treating silica. In the examples, the skilled artisan would find use of 3.0 mL of Et_3Al (1.6 M solution) for 4.0 g of silica, corresponding to a ratio of 1.2 mole organometallic/kg support. By analogy, one of ordinary skill in the art would have found it obvious to use 1.2 mole of organozinc per kg of support because this is shown in the working examples of the prior art. Consequently, one of ordinary skill in the art would have expected such an embodiment to work.

6. Claims 14-16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sartain in view of U.S. Patent No. 6,559,251 to Wang *et al.*

Sartain provides an illustration of a representative, unbridged organozirconium complex (Example 1), but it does not depict bridged complexes such as those recited in the present claims. However, the prior art teaches that the organometallic compounds can be bridged with methylene, ethylene, 1,2-phenylene, dialkylsilyl, and diarylsilyl bridging groups (col. 2, lines 64-67). As indicated by the inventors, bridging the ligand changes the geometry around the transition metal and improves the catalyst activity [as a result of] thermal stability (col. 3, lines 1-5). Thus, it would have been obvious to one having ordinary skill in the art to prepare a dialkylsilyl or ethylene bridged analogue of the organometallic compound shown in example 1, and thereby arrive at the subject matter of the present claims, with the motivation and objective of improving catalyst activity. In this case, L' is unsubstituted cyclopentadienyl. Regarding the substitution pattern of the bridging moiety, one would have found it obvious to place the

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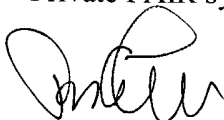
bridging group at the indene C-5 ring (Wang *et al.*, col. 4, line 30), or at the indole C-5 ring (col. 4, line 55) because this is also taught in the prior art. The combination is obvious because both references relate to polymerization processes using the same class of catalyst.

7. Claims 7, 8, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sartain in view of U.S. Patent No. 4,370,456 to George.

Sartain does not disclose the chemical identity of the organozinc component. Nonetheless, the prior art of George teaches treatment of silica support with dialkylzinc compounds, namely, dimethylzinc and diethylzinc (col. 5, lines 29, 40, 50-53, and 57; Table 1) for olefin polymerization catalysts. As such, one of ordinary skill in the art would have found it obvious to use dimethylzinc or diethylzinc to treat the silica support in the process of Sartain because these compounds qualify as organozinc compounds and because George teaches this particular step. The combination is obvious because both references relate to polymerization processes using organozinc treated supports.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (571)272-1104. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached at (571)272-1114. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on the access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).



Rip A. Lee

December 6, 2004